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PART VII

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

■

PRELIMINARY FISHERY MANAGEMENT PLANS

Determination, Preparation, Issuance and Implementation

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

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Determination, Preparation, Issuance, and Implementation

Notice is hereby given that the notice of determination, preparation, issuance, implementation of Preliminary Fishery Management Plans which appeared at 42 FR 6873 on 4th day of February, 1977, is supplemented as follows:

1. In addition to the foreign nations listed on page 6874 from whom applications for permits to fish have been received, applications have since been received from the Government of Japan.

2. In addition to the Preliminary Fishery Management Plans listed on page 6874, the Associate Administrator for Marine Resources of the National Oceanic and Atmospheric Administration has recently approved a PMP for the Shrimp Fishery of the Eastern Bering Sea and Gulf of Alaska.

A Final Environmental Impact Statement (FEIS) concerning this plan has been filed with the Council on Environmental Quality; the Notice of Availability for the FEIS was published on January 28, 1977 at 42 FR 5392.

The Preliminary Management Plan for the Shrimp Fishery of the Eastern Bering Sea and Gulf of Alaska follows below.

Signed this 25th day of February 1977 at Washington, D.C.

WINFRED H. MEIBOHM,
Associate Director, National Marine Fisheries Service.

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1.0 Introduction

The shrimp fishery in Alaska began in southeastern Alaska near Petersburg in 1915. The fishery principally harvested pink shrimp, Pandalus borealis, which were cooked, hand peeled, and frozen for special markets. The fishery gradually expanded, and harvests of 0.8 to 1.4 million pounds (360-640 metric tons) continued until the mid-1950's. In 1957 the mechanical peeling machine was introduced in Wrangell, Alaska. And in 1958 a fishery supported by the mechanical peelers began in Lower Cook Inlet and Kodiak where large stocks of shrimp had been located. The fishery grew rapidly from 7.9 million pounds (3,500 metric tons) in 1958 to 15.1 million pounds (6,900 metric tons) in 1963. Growth slowed when shore plants and the fishing fleet were badly damaged by the 1964 earthquake but then grew rapidly to 120 million pounds (54,000 metric tons) in 1973.

Two separate foreign fisheries have occurred on Alaskan shrimp

stocks. The Japanese conducted a fishery northwest of the Pribilof Islands from 1961 to 1968 which took a total of 95,000 metric tons. By 1968 the stock had been driven to commercial extinction. A Soviet fishery has occurred in waters of the Gulf of Alaska off Cape Mitrofania near the Shumagin Islands and east of Kodiak Island on the north and west sides of Portlock Bank. This fishery grew from 4,000 metric tons in 1964 to 11,400 metric tons in 1967, after which it declined to about 2,000 metric tons. The decline is attributed to enforcement of the U.S. 3-12 mile contiguous fishery zone within which a significant portion of the earlier Soviet catch occurred.

2.0 Preliminary Description of the Fishery

A. Areas and Stocks Involved

The pandalid shrimp stocks of the northeastern Pacific Ocean and Bering Sea are composed of three major species. The pink shrimp, Pandalus borealis, comprises 80 to 90 percent of the catches. Second in importance is the humpy shrimp, Pandalus goniurus, which makes up a substantial element of the catch in shallower and colder waters. Next is the sidestripe shrimp, Pandalopsis dispar, a larger shrimp highly prized by shrimp trawlers. It is found in deeper continental shelf and slope regions. Four other species occur in trawl catches but make up a small proportion of the catch. In order of importance they are the coonstripe shrimp, Pandalus hypsinotus; the spot prawn, Pandalus platyceros; the ocean pink shrimp, Pandalus jordani; and

Pandalus montagui tridens.

The life history of Pandalus borealis has been studied in the northeastern Pacific Ocean and Bering Sea, and since this species probably represents the general life history pattern of other pandalids it will be briefly discussed. The free swimming larvae are released in mid-spring and spend 2 to 3 months feeding on planktonic organisms. By the end of the summer the young shrimp have taken on a semi-benthic existence, spending part of their time feeding in the water column and the remainder on the bottom. The juvenile shrimp develop into males and become sexually active at 2 years. During the third or fourth year the males undergo a sexual transformation and function as females for the remainder of their lives. The result of such a life history is that several age groups must be involved in the breeding population; and this must be considered in management. Spawning takes place in the early fall. Apparently multiple copulations occur and spermataphores, containing the sperm, are attached to the females. The eggs are fertilized as they are extruded from the female and are attached to specialized setae on the abdominal appendages. The eggs are carried for 7 to 8 months before hatching takes place in the spring (Ivanov, 1964; Barr, 1970; Fox, 1972).

B. History of Exploitation

(1) Domestic Shrimp Fishery

Pandalid shrimp have provided a valuable commercial fishery in

the northeastern Pacific Ocean since the late 1800's. In California, Oregon, and Washington the bulk of commercial shrimp landings consists of ocean pink shrimp, Pandalus jordani. In Alaska the pink shrimp, Pandalus borealis, is the major species of commercial importance.

Alaska landings of shrimp increased from 7.9 million pounds (3,500 metric tons) in 1958 to 120.0 million pounds (54,400 metric tons) in 1973 (Table 1).

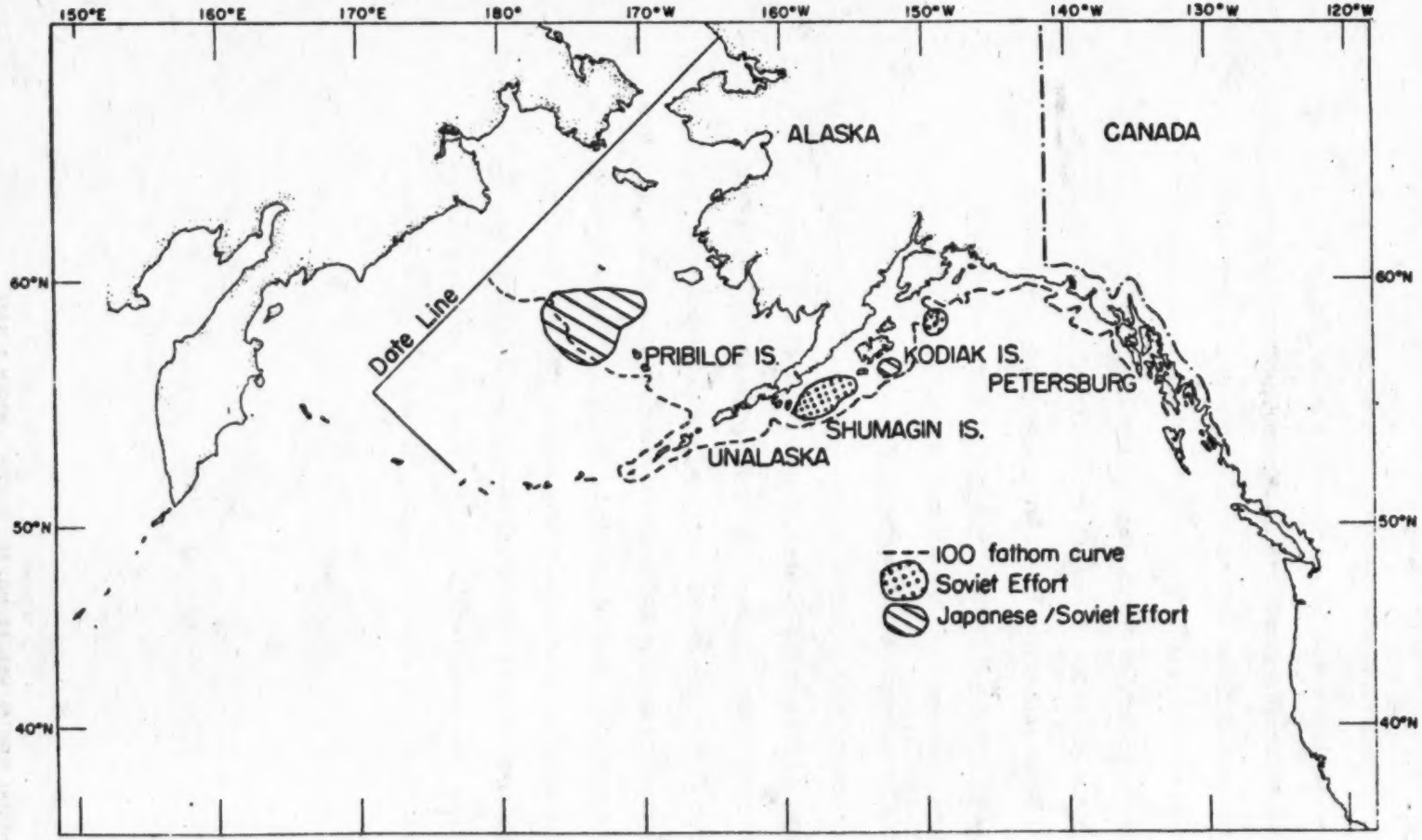
The pandalid shrimp industry of Alaska began in 1915 with the development of a small inshore fishery near Petersburg (Figure 1). Catches in this region gradually increased until 1956 when a peak production of 3.1 million pounds (1,406 metric tons) occurred. In 1957 the mechanical shrimp peeling machine was introduced in Wrangell. In 1958 these machines were introduced in central Alaska and have provided the technological basis for the further expansion of the Alaskan shrimp fishery. In Lower Cook Inlet and near Kodiak Island, catches rapidly increased until catch quotas were implemented by the Alaska Department of Fish and Game in 1972. Since that time catches have remained near 55 million pounds (25,000 metric tons) for these areas. A shrimp fishery started along the Alaska Peninsula in the late 1960's, but landings did not increase substantially until catches in the Kodiak area were limited by quota. Catches from the Alaska Peninsula area have increased from 5.6 million pounds (2,500 metric tons) in 1968 to 47.9 million pounds (21,700 metric tons) in 1974. The fishery has continued to expand to Unalaska Island where catches

Table 1. — Alaska shrimp landings and value to fishermen, 1958–74.

Year	Pounds	U.S. dollars
1958	7,862,366	$ 277,901
1959	13,052,321	505,537
1960	7,426,207	297,499
1961	15,980,500	639,220
1962	16,943,120	731,370
1963	15,126,950	605,080
1964	7,726,750	309,090
1965	16,818,941	756,860
1966	28,192,621	1,287,593
1967	41,812,552	1,700,535
1968	42,023,084	2,299,923
1969	47,850,560	1,908,981
1970	74,256,326	2,979,598
1971	94,891,304	3,909,045
1972	83,830,064	4,493,238
1973	119,963,729	9,341,099
1974	108,274,792	11,044,285

Source: ADF&G Statistical Leaflets

FIGURE I FOREIGN SHRIMP FISHING AREAS OFF ALASKA 1960–1973



have increased to 2,600 metric tons in 1974.

During the early years of the fishery most of the boats in the Alaskan shrimp fleet consisted of "western combination" vessels in the 40 to 85 foot (12 to 26 meters) class. These trawlers were rigged to fish with a single otter trawl. As the fishery grew new West Coast crab-shrimp vessels have entered the fishery. In 1973, Gulf of Mexico style doublerigged (capable of fishing two shrimp trawls simultaneously) shrimp boats also entered the fishery. These newer boats are large modern steel vessels with hold capacities up to a quarter million pounds (113 metric tons).

Conservative estimates of harvest capability of the Gulf of Alaska shrimp fleet can be made using hold capacity. [Using an average of 100,000 pounds (45.4 metric tons) of hold capacity per vessel, 26 trips per year, and the present fleet size of 76 vessels, fleet capacity is at least 90,000 metric tons.]

Gear has evolved to increase efficiency of the shrimping fleet. Shrimp trawlers fish heavily constructed shrimp trawls with recent trends toward larger overall size in both footrope length and height of net openings. With the widespread use of sophisticated depth meters, fishermen are abandoning the broad open gullies in favor of fishing the more productive contour edges. Night fishing has become profitable but still is considerably less so than daylight fishing. Fishing techniques and gear modifications vary among fishermen.

Advances in processing technology have been the primary reason for the expansion of this fishery. During the earlier years catches

were often boiled on the fishing boat itself or delivered to the cannery for cooking. The meats were then handpicked to yield a high quality product with excellent texture and flavor.

In 1957 automatic peeling machines were introduced which provided a more economical method of processing the small shrimp. Although the first machines were introduced in Wrangell in the historic southeastern Alaska shrimp fishery, their application in Kodiak, Seward, and Seldovia in the late 1950's provided the basis for the rapid expansion to the Kodiak-area stocks. The number of peelers in this area grew slowly until the late-1960's, after which it rapidly increased to 66 in 1976.

West of Kodiak Island in 1968 a single processor in the Shumagin Islands operated with three vessels and five peelers. By the 1975 fishing season, 54 peelers were in use in the south Alaska Peninsula area, and the processing capability now rivals that of Kodiak.

Using the number of peelers, we can compute a conservative estimate of current processing capability. In Kodiak, along the Alaska Peninsula, and in Unalaska there is a total of 126 peelers. Again, using a processing figure of 500 pounds per hour per peeler, a 16-hour day, and a 120-day processing year, processing capacity is about 120 million pounds (54,000 metric tons). In 1973 the U.S. processing industry demonstrated it could both process and find markets for this volume of shrimp.

(2) Foreign Shrimp Fishery.

The first foreign shrimp fishery off Alaska was that of Japan which began in 1961 in the central Bering Sea and employed 16 trawlers and one factoryship. Japanese effort peaked in 1963 when 38 trawlers and three factoryships caught 27,127 metric tons of shrimp. After 1963, Japanese effort and catch decreased rapidly; and since 1968, shrimp catches have been produced only incidentally to other trawl operations in the eastern Bering Sea (Chitwood, 1969)[1/].

The U.S.S.R. also began fishing shrimp in 1963 near the Pribilof Islands when six factory trawlers operated for 1 month. In 1964 the Soviet effort shifted to the Gulf of Alaska and peaked at 18 freezer trawlers in 1963. The fishery was carried out principally east of the Shumagin Island group and northeast of Kodiak (Figure 1).

Japanese shrimp fishing efforts have been primarily in the eastern Bering Sea during the period 1961 through 1968 (Table 2). In addition, modest effort was expended in the Gulf of Alaska during the period 1966 through 1968 (Table 3). In 1961 the Japanese shrimp catch in the Bering Sea totaled 14,117 metric tons (Table 2), most of which came from stocks northwest of the Pribilof Islands. The catch increased rapidly to 27,127 metric tons in 1963 and then declined to 451 metric tons in 1968. No directed fishery by Japan on the Pribilof stocks occurred in 1969-75.

The Soviets have concentrated their shrimping effort in the central and western Gulf of Alaska. Soviet catches began in 1964 and

Table 2. — Japanese catches (metric tons) of shrimp from the eastern Bering Sea, 1961-68.

Year	Catch
1961	14,117
1962	18,387
1963	27,127
1964	20,527
1965	8,839
1966	2,984
1967	3,302
1968[1/]	451

Source: INPFC Statistical Yearbook - 1972

1/ No directed fishery has occurred since 1968 although small catches are made incidentally to other trawl fisheries.

Table 3. — Total catches (metric tons) of shrimp from the Gulf of Alaska, 1958-73.

Date	Soviet[1/]	Japan[2/]	U.S.A.[3/]
1958			3,566
1959			5,920
1960			3,368
1961			7,249
1962			7,685
1963		654	6,861
1964	4,032	2,370	3,504
1965	6,985	84	7,629
1966	10,478	474	12,788
1967	11,385	254	18,966
1968	2,858	1,317	19,061
1969	5,307		21,704
1970	4,218		33,682
1971	4,717		43,042
1972	2,313		38,025
1973	2,000		54,415

1/ From U.S.-U.S.S.R. data exchanges.

2/ From INPFC Statistical Yearbook - 1971.

3/ From ADF&G Statistical Leaflets.

reached their peak in 1967 when 11,385 metric tons (25.1 million pounds) were landed (Table 3). Since the United States began enforcement of its fishery jurisdiction to 12 nautical miles in 1968, catches have declined to about 2,000 metric tons (4.4 million pounds) per year.

C. Vessels and Gear Types

The Japanese fishery in the eastern Bering Sea was a mothership fishery. The trawlers delivered their catches to the factoryship in baskets where the shrimp were peeled with automatic peeling machines and frozen or canned (Chitwood, 1969).

The development of the Mayak-class freezer trawler was responsible for the expansion of the Soviet distant water shrimping operations. On these vessels the catches are sorted, frozen in the round on the vessel, and delivered to Soviet ports for final processing. In 1966 the trawl fleet was joined by a Zakharov-class factoryship equipped with U.S.-built Laitram shrimp peelers. Complete processing was accomplished on the fishing ground.

D. Impact on Domestic Fishery

(1) Competition for Stocks

Competition for offshore shrimp stocks in the Gulf of Alaska will likely intensify if foreign fishermen are allowed to continue fishing for shrimp. For example, the domestic fleet expanded its operation offshore following the establishment of quotas and

seasonal closures in the Kodiak area. The area now used by U.S. fishermen extends offshore from Marmot Bay to areas near where Soviet shrimp fleets have operated in recent years. With the imposition of harvest limits for inshore fisheries along the Alaska Peninsula, the domestic fleet will probably explore shrimp stocks farther offshore, particularly those in Shumagin Gulley and the Lighthouse Rocks area. Again these areas have been used by Soviet shrimp fleets.

Domestic harvest of the central Bering Sea shrimp stocks does not appear likely at the present time because of the depleted conditions of that resource.

(2) Gear Conflicts

The foreign shrimp fishery in the Gulf of Alaska occurs in areas where U.S. fishermen seek snow (Tanner) crab (Chionoecetes sp). Gear conflicts between foreign shrimp fishermen and domestic snow crab fishermen have not developed even though the domestic snow crab fishery is conducted during the same time period (winter) and in the same general areas as the foreign shrimp fishery.

(3) Non-Target Species Mortality

Small quantities of fish have been reported in the Japanese shrimp catches from the Bering Sea. During 2 years of high catches (1963-64), the incidental Pacific ocean perch (Sebastes alutus) catch was 3-4 percent of the total shrimp catch. Similar incidence rates for other species were: yellow fin sole (Limanda aspera) — 1.8 percent; Pacific herring (Clupea harengus pallasi) — 3.6 percent; and walleye (Alaska) pollock (Theragra chalcogramma) — 1.9 percent. Recent

information from the U.S. foreign fishery observer program suggests that the incidence of Pacific halibut (Hippoglossus stenolepsis) in Japanese shrimp trawls is considerably higher than the incidence in fish trawls.

(4) Economic Interactions

In 1975 the National Shrimp Congress filed a petition with the U.S. International Trade Commission for import relief under provisions of the Trade Act of 1974. An investigation was started by the Commission and the result is summarized in the following excerpt of their report (U.S. International Trade Commission, 1976).

"Thus, the Commission determines that shrimp, fresh, chilled, frozen, prepared, or preserved (including pastes and sauces), ... is being imported into the United States in such increased quantities as to be a substantial cause of serious injury to the domestic industry catching and landing shrimp."

E. Regulatory History

The Bering Sea shrimp fishery has been unrestricted.

The Gulf of Alaska shrimp fishery, on the other hand, has received a measure of protection from foreign fishing by imposition of the 3-12 mile contiguous fishery zone which forced the Soviet shrimp fleet from productive inshore grounds. Violations listed in Table 4 suggest that "poaching" of inshore stocks may have occurred on an intermittent basis off Cape Mitrofania and in the Lighthouse Rocks areas.

Table 4. — Foreign shrimp fishery violations 1966–76.

1967

March 2 — Soviet freezer trawler

Territorial waters violation — fishing shrimp 0.5 miles off Mitrofania Island, western Gulf of Alaska, position 55–50N 158–56W. Master fined $5,000.

March 22 — Soviet freezer trawler

Contiguous fishery zone violation — fishing shrimp 5.5 miles off Seal Cape, western Gulf of Alaska, in position 56–02N 158–14W. Master fined $10,000.

1971

February 10 — Soviet freezer trawler

Contiguous fishery zone violation — fishing shrimp 9.8 miles off Lighthouse Rocks, western Gulf of Alaska, in position 55–44N 157–42W. Master fined $20,000. Settlement of $30,000 reached in civil suit against the vessel.

1974

February 5 — Soviet freezer trawler

Contingnous fishery zone violation — fishing shrimp 9.5 miles off Lighthouse Rocks, western Gulf of Alaska, in position 55–50.5N 157–40.5W. Master fined $25,000. Settlement of $225,000 reached in civil suit against the vessel.

The domestic fishery in the Gulf of Alaska has been regulated by a complicated set of time, area, and harvest level regulations established by the Alaska Board of Fisheries and administered by the Alaska Department of Fish and Game (ADF&G). This system has evolved over a period of years through public participation in Alaska's regulatory process.

F. Cooperative Research and Statistical Exchange

The Soviet research vessel Krill and the NOAA fishery research vessel Oregon conducted a cooperative shrimp resource assessment survey along the Continental Shelf in the Gulf of Alaska from Portlock Bank to Unimak Pass in 1971. Statistical exchanges have continued and provide minimal information on Soviet catches by broadly defined areas.

Information on catch and effort for the Japanese shrimp fishing off Alaska has been obtained from the Japanese government through the International North Pacific Fisheries Commission.

3.0 Status of Stocks

A. Distribution of Exploited Stocks

(1) Bering Sea

Information on pandalid shrimp distribution in the Bering Sea is available from Soviet exploratory fishing operations and from incidental catches of shrimp during United States demersal crab and fish surveys. The major commercial species, P. borealis, is found along the shelf and slope near the 150-meter isobath. There appears

to be a distinct banding of P. goniurus in shallower water well back from the shelf edge. These distributional patterns reflect the temperature requirements of the individual species. P. borealis evidently requires warmer temperatures and as a result is found near the shelf edge where there is an intrusion of warmer oceanic water. P. goniurus, on the other hand, can tolerate sustained low temperatures and is found in shallower shelf waters where residual winter cooling has a greater effect on the water temperature (Figure 2) (Ivanov, 1964; Anderson and Hartsock, 1975). Pandalopsis dispar is found in the Bering Sea at greater depth than the other species of pandalids.

(2) Gulf of Alaska

The distribution of shrimp stocks in the Gulf of Alaska is well known from State and Federal resource assessment efforts and intensive commercial exploitation. The stock structure is extremely complicated and the biological mechanism that results in local concentrations is not understood. But empirical evidence from commercial harvest has demonstrated the local nature of many subpopulations and provided bases for their individual management.

Both Soviet and United States research vessels have conducted extensive and systematic surveys to locate offshore stocks and to delimit the offshore extent of nearshore stocks of shrimp. In general these studies confirm the experience of the commercial fisheries and have not identified any major new stocks.

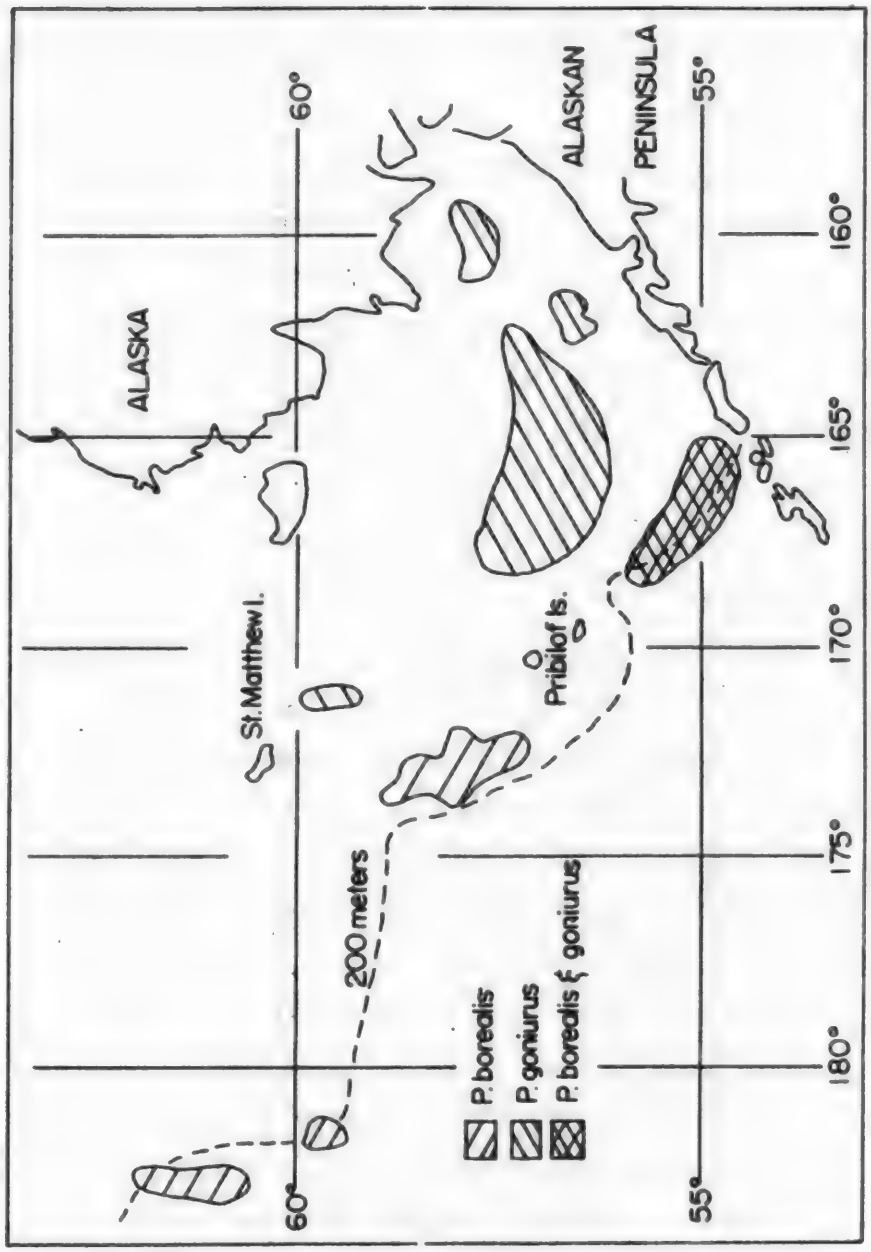


Figure 2: Distribution of pandalids in the eastern Bering Sea, August - November 1975

B. Abundance of Exploited Stocks

(1) Bering Sea

The abundance of the central Bering Sea pandalid shrimp resources must have been high during the early sixties when over 80,000 metric tons of shrimp were harvested in 4 years. Since then catches have fallen off sharply and only incidental catches have been made since 1968. In 1972 a Soviet shrimp survey was conducted to reassess the abundance of shrimp in the area northwest of the Pribilof Islands. That survey yielded an abundance estimate of only a little over 26 metric tons of shrimp in the area of 15 square miles where high densities previously occurred (Ivanov, 1974). This index of abundance is very low and indicates that the central Bering Sea pandalid shrimp stock continues to remain depressed.

(2) Gulf of Alaska

In the offshore regions of the Gulf of Alaska abundance indexes are at a relatively low level. Both NMFS and ADF&G surveys during 1975 and 1976 have shown an almost uniform decline of pandalid shrimp stocks along the Alaska Peninsula and offshore of Kodiak Island. Compared to 1974 these results indicate that the resource, on the average, has declined at least two-thirds (ADF&G, NMFS Cruise Reports, 1975 & 1976). Because a long series of data for this region is not available, the significance of the abundance comparisons and trends cannot be rigorously evaluated. The cause for this dramatic decline in apparent abundance, therefore, is not known.

C.+D.

Current Status of Stocks and Maximum Sustainable Yield (MSY)

(1) Bering Sea

Based on information from Ivanov (1974) and the fact that there has been no intensive shrimp fishery in this area for several years, we must assume the stocks are currently at low levels of abundance. Information is inadequate to estimate MSY.

(2) Gulf of Alaska

Stocks throughout this region, especially in the offshore areas, have recently, and apparently dramatically, declined in abundance. Whether this is a temporary anomaly or the beginning of a long-term deterioration in stock condition is not yet known. Because of this dynamic situation, equilibrium yield cannot be estimated.

A MSY of 50,350 metric tons, which includes domestic inshore fishery areas, can be projected from the midpoint harvest levels established by ADF&G. These harvest level values have been established by analyses based on catch and CPUE trends from the commercial fishery and from independent biomass estimates derived from ADF&G and NMFS resource assessment cruises. This estimate compares with an independent NMFS calculation of 52,164 metric tons using virgin biomass estimates and the best estimate of mortality available (Gulland, 1971).

B_0 = virgin biomass - 149,040 m.t. (based on NMFS and ADF&G data).

M = annual mortality approximately 0.7 for P. borealis (based on NMFS data on growth for P. borealis).

MSY = 0.5 B_oM

MSY = 0.5 (149,040) 0.7 = 52,164 metric tons

4.0 Total Allowable Catches (TAC) and Foreign Allocation

A. Bering Sea

No shrimp fishing should be allowed until it has been demonstrated that stocks have recovered. At that time it is anticipated that the U.S. shrimp fleet will have the capacity to harvest any TAC.

B. Gulf of Alaska

The TAC for this entire region should not exceed 50,000 metric tons[2/], all of this is within the capacity of the domestic fishery to harvest, and there is a dependable domestic market which can utilize the total TAC.

5.0 Conservation and Management Measures Applicable to the Foreign Fishery

A. Bering Sea

No foreign fishery for shrimp will be allowed.

B. Gulf of Alaska

No foreign fishery for shrimp will be allowed.

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7.0 FOOTNOTES

1/ NMFS surveillance and law enforcement personnel have observed three Japanese vessels fishing for shrimp northwest of the Pribilof Islands in July and August of 1976. One of these vessels was boarded and its captain reported that catch rates were in excess of 10 metric tons per day.

2/ The TAC for 1977 may have to be set substantially below the 50,000 metric tons MSY estimate if indications in 1976 of declining abundance are confirmed by further data (page ~~28~~ 21).

[FR Doc. 77-6204 Filed 3-2-77;8:45 am]

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